systematic and random error for individual and population were calculated.
Results: The data showed that the system was able to correct shifts with an accuracy of 3 mm. The population systematic errors were 0.7 mm in L – R direction, 0.6 mm in S – I direction for anterior field and 0.9 mm in A-P direction 0.5mm in S – I direction for lateral field. The population random errors were 1.4 mm in L – R direction, 1.1 mm in S – I direction for anterior field and 0.9 mm in A -P direction 1.0 mm in S – I direction for lateral field.The displacement more than 3 mm (negative orpositive) was 4.17 % in S-I direction, 5.88 % in L-R direction, 6.41% in A-P direction.
Conclusions: The current set up for irradiation head & neck cancer patients using IMRT in our department is accurate. The mean set-up error is less than 3 mm . EPIs can promptly detect interfactional set – up errors in patients during radiotherapy and help radiation therapist to improve set up accuracy. It is a useful device for radiation therapy quality assurance (QA) and quality control (QC).

EP-1330

Evaluation of the dose distribution in the CTV through image guided in prostate cancer patients

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Purpose/Objective: In recent years new radiation therapy (RT) techniques have emerged, that have changed the way treatments are done in the RT service, emphasizing the importance of accuracy in all the stages of treatment.Whatever, the technique of RT positioning of the patient is crucial for the successful treatment, as their verification frequency, along the various fractions, established with suitable protocols. As a control tool for positioning the patient, the various techniques of Image Guided Radiation Therapy (IGRT) allow us to assess the position, and the location of the target volume and organs at risk (OARs) before treatment.The aim of this study was the validation of CTV – PTV margins, in prostate cancer patients. The dose distribution was compared in GTV and CTV volumes, calculated in CBCT images, acquired for treatment verification, with CT planning images. The dose calculation was also validated on CBCT images. **Materials and Methods:** Images from Computed Tomography (CT) scans were acquired out of 19 patients with prostate carcinoma, delineated target volumes and OARs, and carried out the plan in dosimetric planning system (TPS).Subsequently, the CBCTs were acquired in the treatment machine and performed co-registration with CT planning before treatment. In the TPS we reproduced the conditions of the treatment in the CBCTs, with and without the corrections madein the daily treatment (on-line), and calculated the dosimetric plans of the CTin the 166 CBCTs acquired, for comparison of the $V_{95\%}$ $D_{98\%}$ and $D_{100\%}$.
Results: The obtained $V_{95\%}$ of CBCTs with correction was 100% in almost all patients, except one who was 98.8%. In CBCTs with corrections the $D_{98\%}$ and $D_{100\%}$ were above 95% for all patients.
Conclusions: The coverage of the target volume with the prescribed dose has been achieved in all patients and it was possible to reproduce the dosimetric plan of the CT in CBCTs.

EP-1331

The reliability of quantitative thresholding methods for PET aided delineation of GTVs in head and neck tumours.

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Purpose/Objective: PET-CT scans are commonly used for the purpose of gross tumour volume (GTV) delineation in head and neck cancers. Qualitative visual methods (QVM) are currently employed in most radiotherapy departments but these are subject to inter- and intra-observer variability. The aim of this evaluation was to assess the reliability of quantitative thresholding methods to aid GTV delineation.
Materials and Methods: Quantitative thresholding methods which appear in the published literature are evaluated with respect to their reliability for delineation of GTVs in head and neck cancers.
Results: Image segmentation involves the application of a distinct value to all pixels or voxels in an image dataset. This is a complex process affected by numerous variables. Some of the following segmentation thresholds may be applied to automatically delineate specified regions. Standardised uptake value (SUV) is commonly used to apply a threshold for GTV delineation, however this leads to inappropriately large GTVs in head and neck tumours. A further common quantitative threshold is based on the maximum signal on the PET image relative to the background uptake, known as signal to background ratio (SBR). This method generates GTVs that correlate well with surgically removed tumour volumes. Applying a fixed threshold of a percentage of the maximal intensity uptake is also documented in the literature but was found to be unsuitable for the purpose of head and neck GTV contouring. Systems generating volumes based on the physical features of the PET-CT images are also discussed and are found to produce very promising results.
Conclusions: A number of quantitative techniques are evaluated and currently the most suitable is found to be SBR, however even this method was not found to be entirely reliable.
More promising techniques need further evaluation before they could be implemented clinically and a Radiation Oncologist or Nuclear Medicine Radiologist must still validate all GTVs produced by quantitative methods.

EP-1332

An audit of tumour-bed clip matching data for set-up in breast patients at University College London Hospital (UCLH)

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Purpose/Objective: In our institution the tumour bed is localised via the implantation of surgical titanium clips at the point of surgery [1] and verified on the treatment unit with kV imaging and a daily online ‘shift to zero’ policy. As this is a relatively new process within the department, and in the light of the recent national IGRT guidance document [2], we have decided to audit an initial cohort of patients for adherence to, and robustness of, our departmental imaging protocol.
References available on request.
Materials and Methods: A retrospective review was carried out to assess the set-up variation of an initial cohort of patients. Daily kV online match values based on ‘Centre of Mass’ of the clips were extracted from the ARIA database (Varian Medical Systems). The data was analysed for the entire cohort and separately for those patients that had had a simultaneous integrated boost or sequential boost in the light of a 7mm departmental imaging tolerance.
Results: The first thirty breast patients who had completed their course of radiotherapy teir ath were included in the review with a total of 415 image matches. 21 patients had a simultaneous integrated boost (daily kV imaging) and the remaining nine patients a sequential boost (daily kV imaging on boost only).
The mean shifts applied for the entire cohort were:
VRT: **0.29**cm (SD ± **0.22**; Range **0-1.0** cm); LNG: **0.25**cm (SD ± **0.20**; Range **0-0.9**cm); LAT: **0.24**cm (SD ± **0.30**; Range **0-0.7**cm)
The systematic difference between CT and treatment for this cohort was:
VRT: **-0.14**cm (SD ±**0.33**); LNG: **0.03**cm (SD ±**0.32**); LAT: **-0.06**cm (SD ±**0.29**)
This suggests that there maybe a systematic difference in the ‘centre of mass’ in the vertical direction, possibly due to the patients relaxing during treatment compared with CT or posterior movement of the clips. There was no difference in match data between the simultaneous integrated boost cohort and the sequential boost cohort.
Conclusions: This audit shows that the 7mm imaging protocol used by our institution for the clip matching of breast patients is adequate. Further work needs to be carried out to evaluate whether a non-daily protocol would be sufficient for target verification hence reducing imaging dose. The variation in set-up is multi-factorial and includes, patient position, respiratory motion, tumour bed volume changes and clip position changes. This data, however, cannot describe the individual contribution from these factors. Inclusion of more patients into the audit may assist in the development of a non-daily protocol and examining individual clip position may provide information on tumour bed motion and volume changes.

ELECTRONIC POSTER: RTT TRACK: PATIENT CARE AND PATIENT INFORMATION

EP-1333